

AMENDMENTS TO THE CLAIMS:

Claims 1-51 (Canceled)

52. (Original) A multi-mode internal combustion engine capable of operating in a plurality of modes for engine operation, comprising:

an engine body;

a combustion chamber formed in the engine body;

an intake air system for delivering intake air to said combustion chamber, said intake air system including an intake port and an intake valve for controlling flow of one of air and a mixture of air and fuel through said intake port;

a fuel delivery system mounted on said engine body for supplying fuel for combustion in said combustion chamber;

a spark ignition means for initiating a start of combustion when operating in a spark ignition mode;

a variable valve timing system for varying a timing of closing of said intake valve;

a control system for controlling said variable valve timing system to, at least one of:

transfer engine operation from said spark ignition mode to a premixed charge compression ignition mode by adjusting said timing of said closing of said intake valve to increase an effective compression ratio; and

transfer engine operation from said premixed charge compression ignition mode to said spark ignition mode by adjusting said timing of said closing of said intake valve to decrease an effective compression ratio.

53. (Original) A method of operating an internal combustion engine capable of operating in a plurality of modes for engine operation and transferring operation between the plurality of modes, comprising the steps of:

delivering intake air to a combustion chamber of the engine, said intake air system including an intake port and an intake valve for controlling flow of one of air and a mixture of air and fuel through said intake port;

supplying fuel for combustion in said combustion chamber;

providing a spark ignition means for initiating a start of combustion when operating in a spark ignition mode;

performing at least one of: i) transferring engine operation from said spark ignition mode to a premixed charge compression ignition mode by adjusting said timing of said closing of said intake valve to increase an effective compression ratio; and ii) transferring engine operation from said premixed charge compression ignition mode to said spark ignition mode by adjusting said timing of said closing of said intake valve to decrease an effective compression ratio.

54. (New) The engine of claim 52, wherein said spark ignition mode includes a liquid spark comprising a pilot quantity of a fuel for igniting a premixed charge of said fuel and air.

55. (New) The engine of claim 52, wherein said control system is further adapted to cause said fuel delivery system to deliver a post-ignition injection of a fuel into said combustion chamber after a start of combustion of a premixed charge of said fuel and air in said combustion chamber when in said premixed charge compression ignition mode to operate the engine in a post premixed ignition injection mode.

56. (New) The method of claim 53, further including the step of directing an exhaust gas into the combustion chambers to control a start of combustion for the combustion chamber receiving the exhaust gas when operating in the premixed charge compression ignition mode.

57. (New) The method of claim 53, further including the step of sensing a combustion characteristic, generating a combustion characteristic signal and controlling a start of combustion based on said combustion characteristic signal when operating in the premixed charge compression ignition mode.

58. (New) The method of claim 53, wherein said spark ignition mode includes a liquid spark comprising a pilot quantity of fuel for igniting a premixed charge of fuel and air.